A Look at the Information Environment

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Editorial Abstract: While everyone from Joint Publication 3-13 to the soldier on patrol uses the expression "information environment," Mr. Romanych tackles the content and boundaries of this complex entity. He describes how planners and analysts can apply models for characterizing, and then exploiting the newly-mapped realm.

The information environment did not suddenly appear during the late 20th century. It began with human existence and slowly evolved over time with the advance of civilization. Correspondingly, throughout history, military commanders have used the information environment in limited ways (e.g., propaganda and deception) to support their military objectives. Today, with the proliferation of mass communications, the Internet, and other information networks, the information environment is now on par with the air, land, sea, and space as militarily significant dimensions of the battlespace.

The growth of the information environment and its subsequent use for military purposes is analogous to the growth of airpower. Even though air, as a dimension of the battlespace, always existed as an operating environment, it was not until the development of warplanes that military forces could conduct prolonged operations to attack military forces from the air. Today, a similar situation exists with the information environment. Modern armies can now conduct sustained military operations in, and from, the information environment.

The US military recognizes the information environment as a critical part of the battlespace. Joint doctrine now includes a brief description of the information environment and its relationship to information operations (IO) and other military operations. Yet, if our forces are to effectively conduct sustained operations in the information environment, then we must find a way to see the information environment as clearly as we see the rest of the battlespace.

What is the Information Environment?

The information environment is a man-made construct based on the idea that the existence and proliferation of information and information systems has created a new operating environment. This environment can be used by organizations, civilian or military, to gain an advantage over their opponents. As such, the information environment can be used by military forces to further their objectives.

Joint Publication 3-13, *Information Operations*, presents a useful model for the information environment. The model consists of three interrelated dimensions; the physical, informational, and cognitive (Figure 1):

• The physical dimension is that part of the information environment which coexists with the physical environments of air, land, sea, and space. It is where information and communication systems and networks reside, whether they are either technology or human-based.

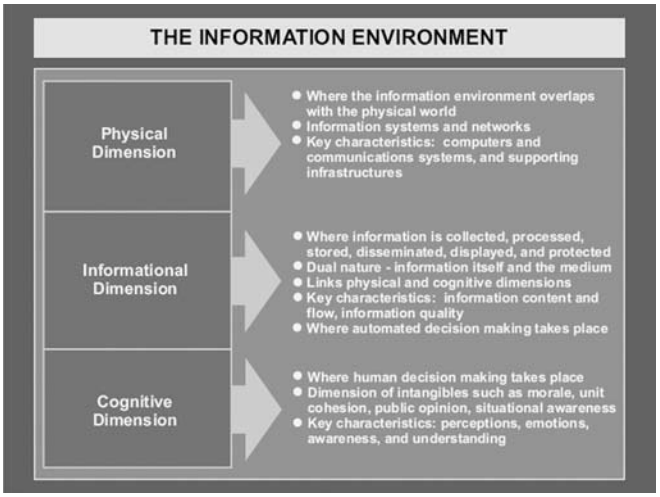

Figure 1. (Joint Pub 3-13)

• The cognitive dimension is the individual and collective consciousness that exists in the minds of human beings. It is where perceptions are formed, and more importantly, where decisions are made.

• The informational dimension is an abstract, non-physical space created by the interaction of the physical and cognitive domains. As such, it links the reality of the physical dimension to the human consciousness of the cognitive dimension. It is the means through which individuals and organizations communicate.

When taken together, the three dimensions explain how the creation and movement of information can create real world effects. At a more practical level, analysis of the three dimensions can explain the character of the information environment in any specific operational area and its impact on military operations.

The Informational Dimension

Of the information environment's three dimensions, the informational dimension is of greatest interest to the practitioners of IO. It is where information exists and therefore is the key to using information as a military capability. The informational dimension is also the least understood part of the information environment.

Without explaining the theoretical nature of information and the information environment, suffice it to say that information moves in and through every operational area. The content and flow of this information creates tangible, real-world effects by converting real (physical) world activities and events into human perceptions. In turn, these perceptions reinforce or alter individual and organizational behavior. Therefore, changes to human behavior result from information content and flow. However, while the impact of the information environment (i.e., changes to human perceptions and behavior) are readily apparent, the primary cause, information flow, is largely unobservable.

Unfortunately, we cannot see the informational dimension the same way we see the physical dimensions of the battlespace. This is because information is abstract and its movement from one place to another is often invisible. If we had the means to see information, it might look like mist moving through the operational area. The mist (information) would appear denser in some places (i.e., urban areas) than in others (i.e., rural areas) in correlation to the concentration of human activity. Also, the mist would continually shift in a complex ebb and flow pattern, reflecting the exchange of information within the populace. Of course, we do not have the means to see information in this manner. Yet, we do require a way to conceptualize information flow and content in physical terms.

Information Flow and Content

It is important to recognize that the information environment exists everywhere in the world and that every operational area has information moving in and through it. Even in remote regions, information flows within the populace and information networks in sufficient quantity to impact military operations.

In more developed regions, the complexity of information content and flow increases in proportion to the development of the information infrastructure and the density of the populace. This is because information is created by, and flows between, humans. In general, with increased information flow, there is greater information content and a corresponding decrease in the ability of military forces to affect the information environment. At some point, from a military perspective, the information environment becomes saturated, meaning that there is so much competing information that military forces have difficulty affecting the information environment. Typically, large, modern cities with their multiple TV, radio, and print medium outlets are saturated information environments.

The movement of information through an operational area is often uneven. This is because information moves at different rates depending on the context and means of transmission. Thus, to estimate the impact of information flow on military operations, IO staffs must chart and track information movement within the operational area. Determining information flow requires knowledge of the sources of information, the means of transmission (both human and technological), and the pathways by which the information moves.

The content of information is also varies within an operational area. Information content is a function of its relevance or importance to the needs of the various population groups and organizations present in the operational area. For example, people located in an area devastated by natural disaster desire information concerning humanitarian assistance, while the populace in an insurgent infested area is primarily interested in information related to security.

The challenge for IO staffs is to determine what information in their operational area is important to the mission. Then, they must identify and track its primary themes and movement in a manner similar to how the rest of the staff observes and monitors the activities of enemy forces and third party entities.

Variations within the Information Environment

Like the rest of the battlespace, the character of the information environment also changes by level of war, mission, and operating area. Therefore, different levels of command (e.g., brigade, division, corps, army, etc.) can face different features of the information environment even though they operate in the same physical area.

IO officer explores variations in information flow. (US Army)

At the tactical level, information flow is primarily by line of sight means such as direct observation, short-range communications systems, and observable means such as graffiti and banners. What people see of their physical surroundings is critical to their situational awareness, perceptions, and behavior. The scope of information content is focused on matters of immediate concern in the operating area. The impact of information flow is often immediate or near real-time (i.e., minutes or hours).

At the operational level, the influence of physical features on the information environment diminishes. Information easily moves over the horizon by long-range and satellite information systems. Geography remains a consideration in that it affects the location of information systems and the populace that use

those systems. In terms of scope, information content is much broader than at the tactical level. However, the rate of change of information content and the speed of information flow are slower. The impact of information is also slowed, perhaps taking days or weeks to manifest itself.

The strategic information environment is the realm of abstract ideas, ideologies, and philosophies. As such, it is almost completely removed from the physical world. Geography has little to no impact. Information flow is via mass communications systems, such as satellite media and the Internet. Impacts generated by information content and flow are measured in terms of months and years.

The assigned mission (i.e., combat, peacekeeping, humanitarian assistance, etc.) determines a military force's relationship to its information environment. It also establishes the relative importance of the information environment's specific characteristics to the conduct of operations. For example, in Afghanistan—a counterinsurgency mission—tribal structures and sympathies are the information environment's most important features. During the invasion of Iraq—a combat mission—the civilian infrastructure was the primary feature that influenced information content and flow. In the Balkans —a peacekeeping mission—it was the media.

The information environment is not static; it is constantly evolving. Because of physical and cognitive features change with time, the relative importance of the three dimensions, fluctuate within and between operational areas. For example, the physical and cognitive features of urban areas are different than those of rural areas. The only way to make sense of the information environment's changing character and the content and flow of information in the operational area is to map the information environment.

Mapping the Information Environment

The importance of mapping the information environment to aid our understanding of its impact on military operations cannot be overstated. Imagine conducting a military operation without a map. Lacking a representation of the operational area, it is very difficult, if not impossible, to describe the location and movement of forces in any detail or precision. The same holds true for information operations. Not knowing the characteristics of the information environment or its potential impact on military operations risks the misemployment of IO capabilities.

Like geography, the information environment is not uniform. The topography of a specific information environment is determined by the physical features of the operational area—terrain, information infrastructure, population demographics—and people's cognitive aspects and organizations present in the region—their collective values, beliefs, and perceptions. Interactions of these factors form distinct sub-information environments, or areas in which the information environment's characteristics are notably different from those of adjacent areas. Analysis of a specific operational area can identify sub-information environments and their affect on friendly and enemy military operations.

Within each sub-information environment are information nodes. Information nodes are places, persons, or infrastructure that shape information content and flow by creating or transmitting information into the surrounding area. Information nodes can be human (e.g., key communicators or leaders) or technological (e.g., cellular telephone towers, media outlets, religious or meeting centers), or both. Some information nodes are key terrain in that they critically affect information flow and content within the battlespace and provide an advantage to the side that controls them. These nodes are typically located at the nexus of information content and flow. Nodes critical to both are key terrain in the information environment. For example, a well-known mosque with an influential Imam is a possible candidate for a key node because it creates or perpetuates information content that can affect military operations. If nothing else, by identifying and acting on key terrain in the information environment, a military force can affect the information environment.

Conclusion

To effectively plan and execute an information operation, IO staffs must map their information environment. This can be accomplished by determining those features of the physical, informational, and cognitive dimensions that are relevant to the mission and that affect information content and flow. The result is the identification of sub-information environments and information nodes within each identified sub-environment, as well as an estimate of how information content is created and flows within the operational area. Using this information, the staff then can identify information nodes to be addressed by the information operation. While this is not a prefect process, it is one way to see the information environment.